Biology of Two Hunting Wasps

The Specific Descriptions of a New Species and one allotype of *Sericophorus*, and a new Blowfly *Pollenia*.

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(Plate XIX and figures 1, 2.)

INTRODUCTION.

For more than seven years the author has had several extensive and populous colonies of sericophorine wasps under daily observation, and the results of that investigation in the taxonomy, morphology, and biology of the genus *Sericophorus* Sw. et Shuck, are contained in a large monograph.

Since 1930, the author had had in his possession a unique female wasp, collected near Portland, by an old and respected member of the Victorian Field Naturalists Club, the late J. E. Dixon, but the collector could not add to the datum, "taken on the flowers of a tea-tree, *Leptospermum* sp. ?."

As the research progressed, it became advisable to study, if at all possible, the unknown male, and the author invited Clifford W. Beauglehole, Portland Field Naturalists Club, to co-operate by searching the district of Gorae West, some 9 miles from Portland, in an effort to discover the other sex.

This correspondent, fortunately, was most successful in the field, and collected not only the desired male, but also both sexes of two other species, the descriptions of which are included in the author's monograph.

With the utmost enthusiasm he then essayed the more difficult task of discovering the "nesting" sites, and the shafts in the ground. As the result of his conscientious work over three seasons, 1951-52-53, it is now possible to give a detailed account of the biology of two more species and their predatory habits. The architecture and behaviour, and indeed, the prey itself, showed remarkable deviations from the typical pattern studied by the author at Sandringham and Cheltenham, Victoria; by Norman W. Rodd, at Tallong, New South Wales; and by Rica Erickson, at Bolgart, Western Australia.

The careful observations and patient collecting of these several correspondents amply confirmed the author's contention that the sericophorine wasps are of prime economic importance to the pastoral industry, and probably are man's most efficient allies in the battle to control the pest blowfly by biological agents. The author proposed a scheme for their conservation and protection in his monograph, and there is little need to repeat the details here. The activities of the wasps resulted in the discovery of a new blowfly, the specific description of which is appended.

Although no work had been done on the taxonomy for some eighty years, the author's researches increased the number of species from five to nearly 50, and the biology of several has been exhaustively investigated. The species are in the genus *Sericophorus* Swainson and Shuckard (Hist. Ins., 1840, p. 181), Family NYSSONIDAE, Subfamily SERICOPHORINAE, and the obscure taxonomy is dealt with at length in the monograph.

However, since all the MS., and the numerous plates and text-figures, had already been completed for the press, and are awaiting publication in the Memoirs of the National Museum of Victoria, the inclusion of the new material in that medium presented insuperable difficulties. The new observations are considered to be of such a valuable contribution to our knowledge of these beneficial wasps, that it was ultimately decided to publish them separately as a nota previa, although they naturally constitute an addendum to the monograph which may or may not appear before this paper is published.

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Sericophorus sculpturatus, sp. nov.

Type, Male:—Length, 5 mm. approx. Peacock-blue, with fulvous legs and flagellum; hair white.

Head almost circular from the front, sericeous; face with long white hair beyond the scapes, and black laterally; frons with a short thick keel, and scattered piliferous punctures; clypeus almost circular and convex on disc, black, but laterally deeply depressed, uneven puncturing and tessellation producing a rough sculpture on the disc, anterior margin with two small teeth and a raised rim; supraclypeal area bluer, rising to a keel; vertex with depressed areas about the ocelli; compound eyes with anterior margins parallel; genae sericeous, with a few white hairs; labrum reddish; mandibulae arcuate, amber, black basally, red apically, a large outer tooth; antennae with blue scapes, and dark second segment, other segments fulvous, and wider than long, and progressively stouter, apical segment darker.

Prothorax blue, a few white hairs laterally, appressed; tubercles blackish, with a white fringe; mesothorax sericeous, blue with a metallic-green lustre, scattered shallow piliferous punctures each with a microscopic dark hair; scutellum bluer, concave, with the large compressed tubercle black; postscutellum blue, but very small; metathorax large, shining blue, the shaft of the cruciform feature lacking the transverse rugae, the "arms" lacking any rim, several longitudinal carinae laterally, with a few white hairs; abdominal dorsal segments blue, shining, a subobsolete tesselation, scattered piliferous punctures and a dusting of white hair laterally, caudal plate black; ventral segments similar.

Legs bluish, flushed with a reddish sheen, femora apically and all tibiae fulvous, with five strong spiculae, a few white hairs; tarsi fulvous, long, anterior with five long spines; claws fulvous, the pulvillus large and black; hind calcar very long, fulvous, finely serrated; tegulae piceous; wings hyaline, very iridescent; nervures dark-sepia, first recurrent entering the first cubital cell a long way short of the second cubital cell, which is almost triangular, and receiving the second recurrent at its end; pterostigma sepia, with a darker margin; humuli about nine.

Locality:—Busselton, W.A., 6th Ap., 1954, leg. Alfred Snell.

Type in the collection of the author.

Allies: The new male falls between *S. claviger* (Kohl) which has "knotted" antennal segments, and apical segments of abdomen red; *S. minutus* Raym. which has no teeth on clypeal margin, and flagellar segments dark above. *S. niveifrons* Raym. and *S. spryi* Raym. are related, but the latter has a black head.

The new wasp is a small, but very handsome species, and was obtained by the collector when sweeping over the flowers of a hedge of "potato creeper?" The small blooms were remarkably abundant, and several specimens of a small form of *S. relucens* Sm. were collected together with several hundreds of minute bees. The season was notable for the lack of other flowers, and the nectar-loving insects were concentrated on the garden hedge of a dwelling. The wasp had a number of straw-coloured spherical pollen-grains entangled in the hairs of the metathorax. The plant was later identified as *Boussingaultia baselloides*, or "madeira vine," introduced to Australia.

Sericophorus victoriensis Raym.

Allotype, Male:—Length, 8 mm. approx. Bluish-green, red legs entirely sericeous.

Head almost circular from front, dull, with white and black hair; face with considerable white hair on lower portion (on upper portion in *S. sculpturatus*); frons with vestigial line reaching ocellus, prominent; clypeus of similar colour, with two teeth on margin; some white hair; supraclypeal area with a short raised line; vertex with the black and white hair intermixed; compound eyes with anterior margins practically parallel; genae with a few white hairs; labrum reddish; mandibulae reddish, black apically, somewhat arcuate; antennae with scape and first segment of flagellum dark, other segments apricot, a black spot apically.

Prothorax not so closely appressed as in other species; tubercles blackish, with a fringe of white hair; mesothorax with the small piliferous punctures not so close as in *S. chalybaeus*, some black hair, four short deeply impressed lines anteriorly; posteriorly two short inconspicuous lines of white hair; scutellum of similar sculpture, but with a conspicuous black compressed tubercle; postscutellum rougher; metathorax bluer, brighter, with the cruciform structure very clearly defined, numerous white hairs, dorsum closely punctured, six or so lateral carinae on the declivity; abdominal dorsal segments sericeous, bluer; a dusting of fine white hair, basal tergum elevated to a tubercle, hind margins depressed; ventral segments similar.

Legs bluish, the femora on the apical half and all tibiae apricot-red; tarsi of similar colour, with six spiculae on anterior basitarsus; claws red, the webbed pulvillus very large and beautiful; hind calcar finely serrated, red, one much larger than the other; tegulae dull, and greenish; wings subhyaline, but very iridescent; nervures light-brown, the first recurrent entering the first cubital cell far distant from the first intercubitus; second cubital cell almost a trapezium; pterostigma amber, wih a dark margin; hamuli twelve, strong.

Locality:—Cape Nelson Road, Portland, Victoria, 20th Jan., 1953, Clifford Beauglehole.

Type in the collection of the author.

Allies:—Clearly closely related to *S. chalybaeus* Sm. which is bluer, and duller. In my key it falls between this and *S. sydneyi* Raym. The type female was taken by J. E. Dixon at Portland, Victoria.

It was taken by the collector together with a long series of typical females dug up out of shafts in the ground, and notes on the biology of these valuable wasps are included here.

The eggs of this species are devoured by two species of small parasitic wasps, *Nysson portlandensis* Raym., and *N. hentyi* Raym. The morphology of *Nysson* is illustrated with a Plate, and the biology is described in Victorian Naturalist, pp. 123-127, November, 1953.

A NEW BLOW-FLY.

Family CALLIPHORIDAE.

Subfamily CALLIPHORINAE.

Genus *Pollenia* Robineau-Desvoidy, 1830.

Pollenia tragica, sp. nov.

Type, male:—Length, 10 mm. approx. Blackish-bronze.

Head: eyes sub-holoptic, bare, facets uniform throughout; face concave, black on lower half, silvery above, anterior margin pallid; frontal stripe well-developed, with a curved striate sculpture laterally on the frons; parafacialia rather wide, with a few straw-coloured hairs; genae excessively small; buccae with many long golden hairs; antennae black, dull, the third segment very large, silvery, of typical form; arista black, plumose on median third, thickened at base; palpi black, with whitish hair.

Thorax: mesonotum with a dull bronze-green sheen, and a few long white hairs among the scattered black ones; pleural region has much conspicuous long light-golden hair; scutellum posteriorly has a fringe of long golden hair; metanotum not quite hidden in the middle under the fringe of the scutellum.

Abdomen: metallic-black, with a bronze sheen, covered with many long fine black hairs, and many strong black bristles; first visible segment with much long black hair, but no marginal macrochaetae; second segment with six pairs of marginal bristles; third and fourth segments with many long black macrochaetae spread over the dorsal surface; the tip of the abdomen truncate; laterally and apically there are many golden hairs among the black ones; the sternal plates bear much long straw-coloured loose hair (a few of these are scattered over the dorsal surface).

Legs: slender, black; posterior coxae with a tuft of long golden hair; anterior and posterior femora with a fringe of golden hair; posterior tibiae with eight long black bristles; tarsi black, with black hair; claws black, pulvillus large and pallid.

Wings: hyaline; neuration typical of the CALLIPHORINAE; very iridescent; the fourth longitudinal vein practically straight; stem vein hardly heavier than the others; third longitudinal vein does not turn forward on the costa; upper marginal cross-vein concave; costal bristle inconspicuous; halteres amber, very small, squama pale-amber, large.

Chaetotaxy: parafrontals 7; parafacials 7; ocellars 3; vibrissae 1; apical scutellar bristles 2; a subappical bristle; a lateral scutellar bristle; a basal scutella bristle; and three median bristles on the dorsal surface; acrostichals 2:3; dorso-centrals 2:3; intra-alars 1:3; supra-alars 4; post-alars 2; notopleurals 2; numerals 4; post-numerals 3; praesuturals 7; prostigmatic bristle present; sternopleurals 3; mesopleurals 5.

Locality:—Cape Nelson Road, Portland, Victoria, Jan. 1953, leg. Clifford Beauglehole.

Type is in the collection of the author.

The specimen was taken, along with several other victims, from a cell in the ground, and which had been provisioned by the hunting wasp, *Sericophorus victoriensis* Raym. Notes on the biology of this wasp are appended.

Many pollen-grains were entangled in the long golden hairs of the pleural region, and at least three botanical families were represented, probably EPACRIDACEAE, LEGUMINOSAE, and MYRTACEAE, and these suggest that the wasp had attacked and captured the fly whilst it was visiting flowers.

BIOLOGY.

Sericophorus victoriensis Raym.

In 1950, at the request of the author, Clifford Beauglehole, of Gorae West, began to search his district for the nesting sites of sericophorine wasps. From 1950-53 he had steadily collected a number of specimens, including *S. chalybaeus* Sm., *S. cliffordi* Raym. and *S. victoriensis* Raym.

The locality where he found the first specimens is a typical open one of heathy land, carrying *Eucalyptus baxteri; E. viminalis* var. *huberiana; E. vitrea; E. ovata*, and there are extensive areas of *Leptospermum scoparium*, and *Melaleuca squarrosa*. These myrtaceous plants were in bloom, consequently there was no lack of either nectar or pollen for the wasps.

Since *S. victoriensis* seemed to be more numerous than the others, the author sent an outline of the probable situation of the shafts, and after three years, on the 10th January, 1953, the collector was successful in discovering an extensive colony in an area of loose white sand at the side of the Cape Nelson road. It was established in a strip six feet wide, which separated the road from a small bank some three to four feet high. Loose sand continually slides down, and the wasps appear to avoid this instability, consequently, they keep to the firmer level ground.

The observer found that wind often blew loose sand over the shafts, and so masked the entrances. However, the wasps flew to and fro over the site, and each one apparently had no difficulty in returning to its own home. He counted 30 shafts, and suggested that many more were present, but had been covered by loose sand, so that probably more than 50 shafts were in the colony. "But new ones are being continually opened up."

The much smaller species, *S. cliffordi* Raym., nests in the same area, but it preys on a small black fly *Musca vetustissima* Walk [now *M. sorbens* Wied.] and it certainly would not be equal to attacking the large blowfly. Many larvae were excavated, and their gross morphology was similar to that of *S. teliferopodus* Raym.; the six lateral tubercles being equally conspicuous. There are no specific characters to separate them from the larvae of other species.

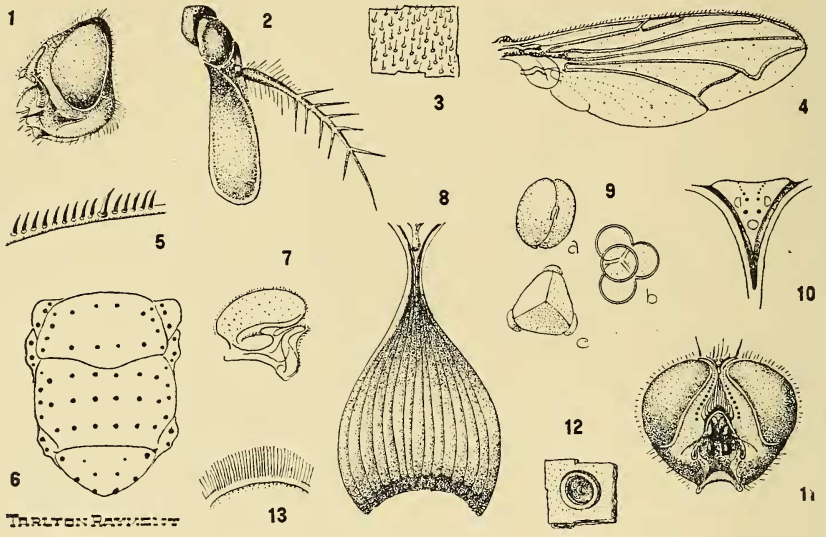

Fig. 1: Details of new Blowfly.

No.

1. Lateral view of head-capsule of male fly, *Pollenia tragica* Raym.
2. Antenna and arista much enlarged.
3. Portion of wing showing its fine hairs.
4. Wing of the male.
5. Costal spine is inconspicuous.
6. Diagram to show macrochaetae of thorax.
7. Squama and haltere are pale-amber in colour.
8. The striate sculpture of the frons is distinctive.
9. Pollen-grains removed from the thoracic hairs of the fly.
10. The ocellar triangle, or platform, much enlarged.
11. Frontal view of head-capsule.
12. A scar remains to indicate the position of any bristle that may be broken off.
13. Margin of squama more highly magnified.

At 9.30 a.m. there was considerable activity at the colony; many females were digging vigorously, and others were returning with their prey which were later identified as male flies in four genera. The hunting is continued throughout the day.

To test whether or not the prey is killed outright at the initial attack, the observer captured several wasps bearing their victims, and took the flies away. Clifford Beauglehole had no means of determining whether they were dead or merely in a coma, but the blowflies did not move for three

days, and as they did not decay, it would appear that the poison injected by the sting has a preservative effect, keeping the meat "fresh" sufficiently long to enable the larva of the wasp to consume it in a wholesome condition.

It was evident that the "season" for the wasps must have opened several weeks previously, for this was demonstrated when 20 cells were excavated, and the gravid cocoons carefully removed. Of 14 cocoons removed, 10 contained female larvae and 4 male; the cocoons of the females measured 12.5 mm. at the long axis, and 5.5 mm. at the short; those of the males 10 mm. and 4.5 mm.

The shafts went down in the loose sand for an inch or two, then turned at a slight angle for six inches, and finally, as the harder subsoil was approached, the shafts took on a circular turn before the cells were finally constructed at 12 inches down. Since the red subsoil is used for the short hard turret, the entrance always forms a conspicuous splotch of dark colour on the white sand.

There is conclusive evidence that, in certain circumstances, two or more wasps will use the same shaft, and this is in marked contrast to the habit of *S. teliferopodus* Raym., where the rule is strictly one female to each shaft, although it will be remembered that Rica Erickson observed two or more shafts often close together.

The observer says—"There were several cells or cradles in the first shaft that I excavated. I am sure of this because I selected a lone shaft, so as not to confuse the contents with cells of other shafts. Altogether, I saw 20 cradles at a depth of about a foot, and of these, 14 had completed cocoons, and the others were almost finished. I'm not certain about the branching of the shafts, but will try to check this later.

"I certainly saw one wasp enter a shaft with a fly, and 10 minutes later, another wasp returned and entered with a fly. I have also seen a wasp enter with a fly, and almost immediately after, another wasp, without any prey, descend the same shaft." It will be observed that the hunting of the prey by *S. victoriensis* is done much later than the early hour favoured by the Sandringham species, 5-6 a.m.

"I excavated a shaft which was in constant use, although it was very close to another, and I found seven cradles at the bottom; they contained 36 blowflies and 2 strangers." The prey was distributed as follows:—

No. 1. 6 large blowflies—plus one strange fly (see *Pollenid*).
No. 2. 4 large blowflies—probably incomplete provision.
No. 3. 3 only large blowflies, but cell was incomplete.
No. 4. 6 large blowflies—plus one strange fly.
No. 5. 5 large blowflies—but no strange fly.
No. 6. 5 large blowflies—but no strange fly.
No. 7. 5 large blowflies—but no strange fly.

The two species of blowflies were identified as *Calliphora stygia* Fabr. and *Pollenia tragica* Raym., and it will be observed that the average number of flies stored in each cell is probably 5.

The egg is deposited on the first fly captured, and this is the habit of all the other wasps studied by the author. The egg is laid on the under surface of the thorax; on the left side in six cases out of the seven. It is attached near the articulation of the front leg, and it would seem that, in some cases, the leg of the fly is lifted up by the wasp, thus permitting her to place the egg exactly where she wishes.

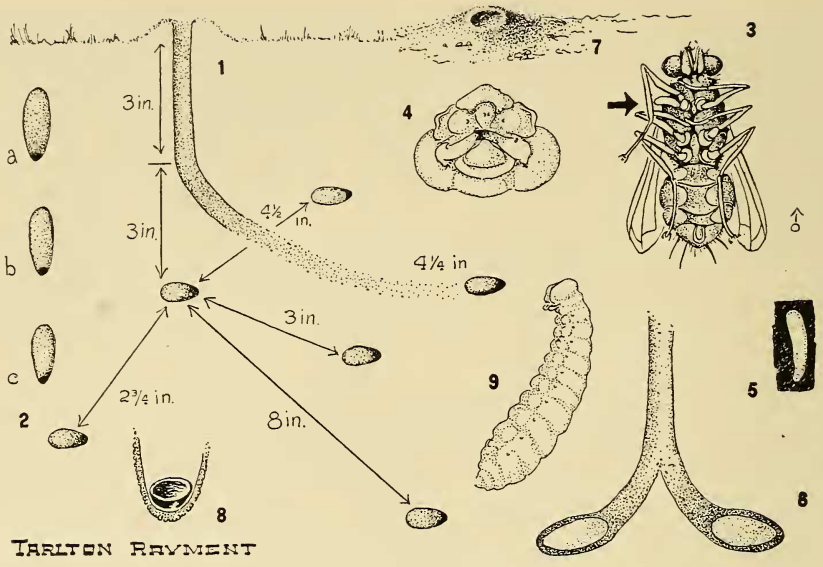

Fig. 2: Details of *Sericophorus*.

1. Nest of the wasp *Sericophorus chalybaeus* Sm. with six cells radiating from the main shaft. The small figures indicate the length in inches of the galleries, filled so perfectly by the female that they could not be identified. (Drawn from a sketch by Clifford Beauglehole.)
2. a. Cocoon of *S. chalybaeus* Sm.; b. *S. victoriensis* Raym.; c. *S. cliffordi* Raym.
3. Ventral view of fly, *Musca scorbens* showing the anterior leg raised by the wasp, *S. cliffordi* Raym., to place her egg (see arrow) at the articulation of the coxa.
4. Anterio-ventral view of head of larva.
5. Egg of *Sericophorus*.
6. Typical dichotomous shaft of *S. teliferopodus* Raym. with its two cells at the end of short galleries.
7. Tumulus of sand at the entrance to the shaft.
8. Black wad of excremental debris at base of cocoon.
9. Young larva of *S. chalybaeus*.

Beauglehole was fortunate in collecting several mutilids that haunted the vicinity of the shafts, and there is little doubt some of these at least are parasitic on the larvae of the wasps. His most interesting discovery was two wasps of another genus, and which he thought might deposit its egg on the young larva.

This observer posed the following question. "Do you know of any parasitic wasp which lays its eggs in the sericophorine nests? There is one here which appears to be parasitic. I watched her actions for an hour or so, and it immediately followed down a sericophorine that had just descended with her fly.

"A few minutes later, the parasite ? emerged from the shaft, and waited at the top, facing the entrance, and every now and then she looked down the shaft, as though expecting something to happen.

"The sericophorine came up out of the shaft after a few minutes, drawing the front legs over the jaws and face and while she was engaged in cleaning her eyes, the parasite moved back out of sight behind the mound at the entrance.

"After the sericophorine wasp had flown away, the parasite went to the entrance again, and was about to descend, when it was disturbed by a passing automobile. However, I was successful in obtaining two specimens for you." These proved to be new, and were described as *Nysson hentyi* Raym., and *N. portlandensis* Raym. The morphology and biology were published in Victorian Naturalist, pp. 123-127, Nov., 1953.

During January, 1953, Beauglehole found that for some obscure reason, the supply of golden-haired blowflies failed, and *S. victoriensis* then directed her attacks to another species not so large as the usual chubby blowfly. The "new" prey is not related to the common golden-haired blowfly, and the specific description is included here. Other "strangers" were present in cells 1 and 4, *Calliphora hilli* Patt. and *Heliora caerulescens* Stein.

There was no means of determining whether or not the scarcity was due to the activity of the wasps. The observer concluded that it was, but it may have been due to adverse weather conditions, or even a normal cycle in the biology of the blowfly. However, the observer wrote—"It would seem that these valuable wasps have so reduced the brown blowfly that they are forced to take another species. Each cell that I excavated now contained 8 smaller black flies, and out of 38 flies recovered from the cells, only one was a brown blowfly."

The smallest black flies averaged 8 mm. in length. The head is small, and the face silvery; the black arista plumose; mesothorax finely mottled with grey; each abdominal segment bears an ivory patch; the long slender legs are black; the wings subhyaline. They were identified as *Musca vetustissima* Walck (now regarded as *Musca sorbens* Wied).

The larger grey fly is not so numerous, and is taken only occasionally, and has been determined as a new one (see specific description). Both species are extremely hairy, with numerous strong black bristles.

A black spider-hunting wasp, *Pseudagenia* sp., is often found making use of the sericophorine shafts, and these will be described in a separate paper.

A CHANGE IN HABIT.

Biology of *Sericophorus chalybaeus* Smith.

Clifford Beauglehole, while collecting for the author, reported that he had observed two females of *S. victoriensis* using the same shaft. When he excavated the "nest" he then found that several cells were present. As this was a matter of some importance, since such a habit was contrary to what had been observed at Sandringham of *S. teliferopodus*, the author stressed the possibility of his having been confused by the close proximity of the cells.

Where several shafts are excavated close together, the wider dichotomous branches at the bases are thus necessarily practically contiguous, since they are approximately at the same level. The naturalists uncovering such a group would very naturally conclude that the cells had been built as one cluster. This state is frequently experienced when investigating fossorial bees such as *Nomia* and *Halictus*.

In February, 1953, the collector had the good fortune to discover half a dozen shafts of *S. chalybaeus* on the roadside close to his homestead. These could be kept under observation more conveniently, and for longer periods, since it was no longer necessary to travel to the Cape Nelson Road.

However, there was a possibility that the collector may have discovered an interesting departure from the typical architecture of two cells, therefore, on the author's advice, Beauglehole sought out one shaft far distant from any others, and excavated it. His report is included here.

"No traces of other moundlets of soil were to be seen, and the shaft was definitely isolated from all the others. Only one wasp occupied the shaft, and during the two hours that I was digging out the "nest," no other wasp arrived to search over the site."

The cells must originally have been excavated at a greater depth than that indicated here, because a mechanical bulldozer had already stripped several inches of topsoil from the roadside when clearing the way for a telegraph line. Just how many inches had been taken off could not be ascertained with any degree of accuracy; probably not less than 14 inches were scooped away.

There was the usual tumulus of loose sand, about $\frac{1}{2}$ inch high, round the shaft, which did not descend vertically, but rather on a low curve. The entrance was still open, and the collector had little difficulty in following it down to the cells. He found six cells in all at the following levels:—

Nos. 1 and 2 were at $3\frac{1}{2}$ inches.

Nos. 3 and 4 were at 4 inches.

Nos. 5 and 6 were at $4\frac{1}{4}$ inches.

"The cells were at various distances from the main shaft, but it was impossible to identify the several tunnels leading to Nos. 1-5 because the wasp had filled them to seal the cells, and she did it so perfectly that all traces of the original tunnels had vanished."

"The six cells now appeared to be clearly separated.

No. 1 was $1\frac{1}{4}$ inches distant, with 6 flies. (5) *Pollenia tragica* Raym.

No. 2 was $2\frac{3}{4}$ inches distant, with 5 flies. (5) *Calliphora stygia* Fab.

No. 3 was 3 inches distant, with 8 flies. (5) *Musca sorbens* Wied.

No. 4 was $2\frac{3}{4}$ inches distant, with 8 flies. (1) *Musca sorbens* Wied.

No. 5 was $4\frac{1}{2}$ inches distant, lustrous, 7 flies. (—) *Heliora caerulescens* Stein.

No. 6 was $4\frac{1}{4}$ inches distant, bluish green, 1 fly with egg.

"It was evident that the wasp was engaged in storing the sixth cell. which was at the bottom of the open shaft, and I caught her when she returned with another fly. Cells 1, 2, 5 and 6 were parallel with the main shaft, but 3 and 4 were built at a right-angle. Of the 35 flies removed from the completed cells, only 16 were golden-haired blow-flies, and the number in each are included in brackets in the above table; two blow-flies in cells 3 and 4 had an egg on each.

"No. 5 cell contained seven small bluish-green flies, but the rest were like small house flies. Each of the 5 flies had the eggs attached to the right side, but in the Nelson Road cells of *S. victoriensis* the majority of the victims had it on the left side."

This is strong evidence that one species, *S. chalybaeus* at least, departs from the family habit, and constructs more than two cells, radiating from the main shaft. It is amply demonstrated that while *S. teliferopodus* takes only the golden-haired blow-fly, *S. chalybaeus* will attack and capture at least four species of flies. It will also be observed that *S. chalybaeus* prefers the right side of the ventral surface for the egg, while *S. victoriensis* prefers the left.

The egg does not differ from that of the other species investigated, neither does the larva, and the cocoons are identical with those of *S. teliferopodus* Raym. There are no valuable specific characters in the larvae to separate one species from another, such as one finds in the reed-bees *Exoncura*. The behaviour pattern is, however, very different indeed from that of *S. victoriensis* and *S. teliferopodus*. The wasp will attack several different species of flies, an appetite which she shares with *S. victoriensis*.

A long series of cocoons are under daily observation, but so far there is no material difference from those of *S. teliferopodus*, and the larvae, too, are indistinguishable from those of the other species.

EXPLANATION OF PLATE XIX.

Nos. 1-12. *Sericophorus sculpturatus*. sp. nov.

No.
1. Adult male (type) wasp.
2. Front view of head-capsule.
3. Dorsum of metathorax, scutella, etc.; inset "a," sculpture of the dorsum more highly magnified.
4. Fifth abdominal sternum: note gradulus, and compare with No. 16.
5-6. Apical sternum and tergum of male abdomen.
7. Dorsal view of male genitalia.
8. Serrated margin more highly magnified.
9. Hamuli of posterior wing.
10. Basitarsus of anterior leg.
11. Glossa and palpi of male.
12. The calcariae of the posterior legs.

Nos. 13-25. *S. victoriensis* Raym.

13. Clypeal teeth of male (allotype); outer one is larger.
14. Serrated margin more highly magnified.
15-16-18-19. Apical sterna of male abdomen.
17. Apical tergum of male abdomen.
20. Dorsum of metathorax, scutella, etc.; inset "a," sculpture of the dorsum more highly magnified. (The amount of mesothorax included is a criterion of the size of the wasps).
21. Basitarsus of the anterior leg.
22. A myrtaceous pollen-grain from the "face."
23. Clypeal teeth of male *S. victoriensis* Raym.; the inner one is larger.
24. Lateral view of genitalia of male.
25. Strigilis of anterior leg; even the small velum is serrated.
26. One of the pollen-grains of the "potato-hedge" plant.

(Figures are at various magnifications, but all corresponding parts are drawn at the same magnification. Allowance must be made for distortion due to pressure of the cover-glass.)